unintentional hepatotoxicity, especially in persons with high alcohol consumption.[5] Ischemic liver injury can be caused by an abrupt decrease in cardiac output, especially when combined with hepatic venous congestion. This can occur unobserved when a patient with serious valvular or myocardial disease has arrhythmia during sleep. Acute obstruction of the common bile duct by a gallstone can cause the aminotransferase levels to rise for a day or two to more than 1,000 U/L. This can be especially confusing because the alkaline phosphatase level may take several days to rise, and imaging studies may not initially show bile duct dilatation. If the initial evaluation of a patient with greatly elevated aminotransferase levels is negative for viral hepatitis, then other less common causes of acute hepatitis, such as autoimmune hepatitis or Wilson disease,[6] should be considered.

If the initial clinical evaluation and a basic laboratory evaluation for hepatitis A and B do not reveal a diagnosis, then it may not be possible to reach one. Further laboratory evaluation may be guided by the clinical course. For any patient who appears ill with acute hepatitis, the prothrombin time should be measured, and an assessment should be done for hepatic encephalopathy. Regardless of the cause, any evidence of encephalopathy or a substantially prolonged prothrombin time should prompt hospital admission and close follow-up. Also, any patient with acute hepatitis, regardless of the cause, needs to be observed until the acute liver injury resolves.

References

1 Niermeijer P, Gips CH. Natural history of acute hepatitis B in previously healthy patients; a prospective study. *Acta Hepatogastroenterol (Stuttg)* 1977;24:317-325.
2 Schiff ER. Atypical manifestations of hepatitis A. *Vaccine* 1992;10 Suppl 1:S:18-20.
3 Hoofnagle JH. Hepatitis C: the clinical spectrum of disease. *Hepatology* 1997;26(3 Suppl 1):15S-20S.
4 Schwartz E, Jenks NP, Van Damme P, Galun E. Hepatitis E virus infection in travelers. *Clin Infect Dis* 1999;29:1312-1314.
5 Johnston SC, Pelletier LL Jr. Enhanced hepatotoxicity of acetaminophen in the alcoholic patient. Two case reports and a review of the literature. *Medicine (Baltimore)* 1997;76:185-191.
6 Larcher V. Chronic active hepatitis and related disorders. *Clin Gastroenterol* 1986;15:173-198.

Lessons learned from and future expectations of complex emergencies

Where civil blood makes civil hands unclean
—Shakespeare, *Romeo and Juliet*, 1597

Complex emergencies today represent the ultimate pathway of state disruption. Zwi and Uglade say that recent conflicts such as those in northern Iraq, Somalia, Rwanda, Angola, the former Yugoslavia, and the province of Kosovo should be interpreted as complex political disasters in which "the capacity to sustain livelihood and life is threatened primarily by political factors, and in particular, by high levels of violence".[1] Although each of the over 38 major conflicts that have occurred in this decade since the end of the Cold War is unique, all share similar characteristics (box). The most blatant is that they represent catastrophic public health emergencies in which over 70% of the victims are civilians, primarily children and adolescents.

These mainly internal crises are popularly referred to as complex emergencies. The complexity refers to the multifaceted responses initiated by the international community and further complicated by the lack of protection normally afforded by international treaties, covenants, and the United Nations Charter during conventional wars.

Health resources, both civilian (those provided by United Nations agencies, the International Federation of Red Cross and Red Crescent Societies, and many nongovernmental organizations) and military, have played an important part in the emergency response, recovery, and rehabilitation phases of complex emergencies. In the process, health providers have made major advances in assessment, management, education, training, and research,[2-5] and they remain among the few existing political consciences still available to advocate for vulnerable populations worldwide. To be both successful and safe in complex emergencies, health providers need to expand their knowledge base to include issues of integrated management, transportation, logistics, communication, negotiation and mediation, security, and international humanitarian law.

Complex emergencies will continue to threaten the

Summary points

- Complex emergencies represent the international response to state disruption and its sutaining infrastructure
- Understanding of complex emergencies has arisen from the many post-Cold War conflicts of the 1990s, although complex emergencies can be catalyzed by natural and other disasters
- Complex emergencies need to be recognized for the public health disasters they are for the public health expertise required by civil and military authorities

Frederick M Burkle, Jr
Center of Excellence in Disaster Medicine and Humanitarian Assistance (WHO Collaborating Center)
University of Hawaii John A Burns School of Medicine
Honolulu, HI 96826

Correspondence to:
Dr Burkle
skip@website.tamc.amedd.army.mil

Funding: None

Competing interests: None declared

This paper was originally published in the *BMJ* 1999;319:422-426.

West J Med 2000;172:33–38

Characteristics of complex emergencies

- Administrative, economic, and political and social decay and collapse
- High levels of violence
- Cultures, ethnic groups, religious groups at risk of extinction
- Catastrophic public health emergencies
- Vulnerable populations at greatest risk
- Primarily internal wars with major violations of the Geneva Conventions and Universal Declaration of Human Rights
- Increased competition for resources between groups in conflict
- Increased migration of refugees or internally displaced populations
- Long-lasting and widespread

health of nations. In this article I describe the various contributing factors, deficiencies, and needs most likely to precipitate future complex emergencies and outline the sorts of responses that will be needed to deal with them. This article draws on not only on research but also on analysis of the experience of international and non-governmental organizations in dealing with many of the complex emergencies of this decade.

FACTORS INFLUENCING FUTURE COMPLEX EMERGENCIES

Complex emergencies existed during the Cold War but responses were limited or non-existent, primarily because of vetoes on action in the UN Security Council.[6] They will probably continue as a post-Cold War phenomenon through the early part of the next decade, predominantly in Africa, Asia, and South and Central America. As existing governments collapse, militaries become increasingly supported by undisciplined paramilitaries, while insurgents and organized gangs and warlords gain power; the collapse is usually preceded by worsening corruption, criminalization of government, and suspension of the rule of law, such as in Russia and Zaire. In disrupted states (a term first used by H Smith in unpublished paper, 1999), hospitals and clinics are the first to be destroyed and the last to be rehabilitated.[7] Indigenous healthcare providers become refugees early, and those who remain, as in Rwanda and Kosovo, are often targeted or intimidated if they defend the rights of patients.

There are an average of 25 to 35 small-scale conflicts each year,[8] and they require cohesive sociopolitical and economic efforts to prevent them from developing into complex emergencies. By monitoring small-scale disasters we can define the "public health" capacity and capability in many countries by exposing the vulnerabilities and inequities that typically lead to conflict situations.

Major humanitarian emergencies caused by natural or technological disasters (35-60 per year and 15-25 per year, respectively)[8] used to be considered conceptually separate from complex emergencies. But in weakened and disrupted states a natural disaster such as flood, famine, or deforestation, or a major episode of industrial poisoning can expose the same vulnerabilities (box).

Political and legal factors

An emerging view is that a conflict related to ethnic issues is catalyzed in disrupted states by the need of ethnic groups to fall back on what is considered safe and familiar.[9-11] Territorial buffer zones that once separated ethnic groups disappear, causing increased competition for resources and migration of large populations, either as refugees who cross national boundaries or as internally displaced populations.

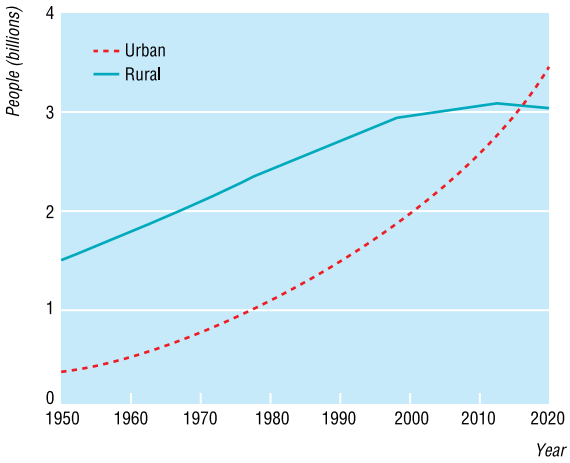
Ethnic-based "ancient animosities" have been savage when complex emergencies develop.[12] Of the more than 6000 cultures that entered this decade some have disappeared through natural assimilation alone. State disruption, however, has placed many minority cultures at risk of extinction. The rate of extinction is so alarming that, if it continues, fewer than 600 cultures will remain by the year 2005.[13] Also, the more removed the culture is from the developed world, the less interest and protection it generates.

Culturally defined customs, skills, and arts passed along to succeeding generations include the foundations of health and public health refinements that allow a people to survive. When a culture is lost, so too is the inextricably connected professional and institutional memory of public health measures. The mitigation that develops as a result of repairs to public infrastructure and rehabilitation projects alone is not enough. This raises the question of whether the loss of a culture, as a consequence of a complex emergency, should be addressed as a critical strategic, political, and security issue.

Membership in the UN's General Assembly requires states to adhere to the Universal Declaration of Human Rights. Once the declaration is violated, several UN chap-

Elements shared by all disasters in disrupted states

- Disasters expose major public health deficiencies
- Natural and technological disasters may catalyze a complex emergency
- Lack of proper resources to respond
- Lack of a security capacity
- Lack of a management capacity
- Politically favored populations do better



In the developing world urban populations will start to outnumber rural ones in less than 20 years (from the International Food Policy research Institute, based on United Nations data)

ters allow the Security Council to bypass the sovereignty of the state where rights are being violated, in favor of non-permissive humanitarian intervention. Under international treaty, once a discrete complex emergency is legally defined as genocide, a sanctioned external force must enter the conflict and stop the slaughter. Political failure to do so (as in Rwanda and Cambodia) has caused a widening gap between claims of protection and actual outcome.

Solutions to the problems of disrupted states will require greater international political decisiveness to overcome legal constraints. A first step is to give internally displaced populations the same legal protection as refugees. Success will then be judged by a reduction of the exceedingly high mortality of internally displaced people and their vulnerable populations—for example, unaccompanied minors.

Socioeconomic factors

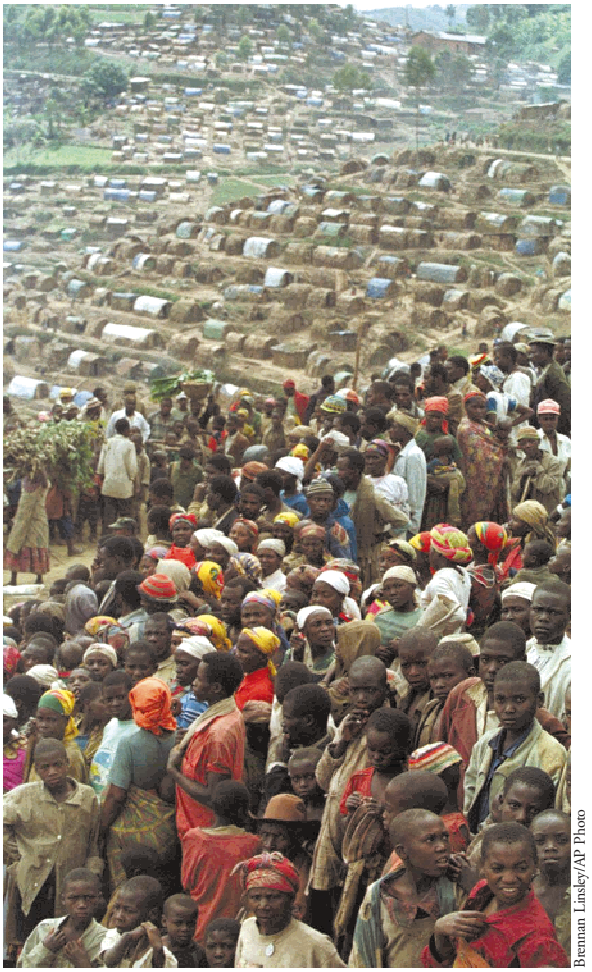
Population increases have always been a threat to social stability. It is not the increase itself but the changing patterns of population that have the greatest potential for contributing to conflict. Both have major health implications. Urban slums currently contain over half the poor people in the developing world, mostly women with children and inadequate support systems. The number of major cities with populations over 1 million are increasing, without a comparable growth in public health infrastructure such as sanitation, water supplies, and clinic services. Migration of populations for both environmental and economic reasons will dominate the next decade, especially in Asia, where resources per capita are the least.)

Early in the 2010s urban populations in the developing world will exceed rural ones for the first time in history (figure). The need for humanitarian assistance is already moving from rural to urban areas. However, critical issues such as the defense of urban public health infrastructure, sanitation, and access to water are not being addressed in existing education, training, and research and management forums.

Unfortunately, political and economic realities make some victims more deserving than others, suggesting that some weakened or disrupted states—those that are considered economically interdependent and geopolitically critical by developed governments—will be favored as recipients for humanitarian assistance and disaster relief. The future requires a transparent humanitarian architecture and a balance sheet of budgeted priorities as well as the coordination of donor agencies with an international mandate and monitoring. Health providers are uniquely qualified as lobbyists and advocates to diminish international fears of governmental self-interest, hypocrisy, and racism in determining humanitarian priorities.

Environmental security factors

Major environmental and ecological abuses occur from deforestation, the damming of waterways, human-



Brennan Linsley/AP Photo

Genocide displaced hundreds of thousands of Rwandans

generated flooding and loss of topsoil, pollution, and the consequences of nuclear and chemical hazards. Environmental security is aimed at preventing "serious political and social instability stemming from human activities which reduce the environment's capacity to sustain life".[14] The term encompasses many of the public health issues inherent in complex emergencies but does so on a larger scale with both national and regional ramifications. One can argue that there is a causal relation between the severe deforestation of the North Korean peninsula and environmental degradation, food and fuel scarcity, and smoldering conflict. Public identification of such environmental factors will cause governments to take action even though such action might lead to military involvement.

RESEARCH ISSUES

Initial responses in the field to complex emergencies were understandably ad hoc. No foundation of applied health research exists for complex emergencies as it does for natural and technological disasters or for conventional cross-border wars. Major challenges were quickly identified in organizational management, refugee care, triage of victims, water and sanitation, nutrition, communicable diseases, and psychosocial, gender, and reproductive issues. Victims in developing countries have high mortality and morbidity from violent trauma, epidemics, starvation, and severe psychosocial disabilities. These public health consequences of refugee displacement and overcrowding affect all age groups, particularly infants and children under 5.[15,16] Similar consequences are evident in the developed countries of Iraq, Yugoslavia, and Chechnya, where heightened trauma and the complications of undernourishment, dehydration, and untreated chronic diseases in infants and elderly people often dominate the clinical picture (R Brennan and BT Burkholder, unpublished data).

The World Health Organization and the Macfarlane Burnet Center for Medical Research in Melbourne have begun to document studies that will build the foundation of research.[16] One effect is that the reports that first raised awareness of human rights and gender and reproductive issues are being transformed into operational programs. Human rights abuses are now documented and a response coordinated, with early psychosocial and legal counseling offered by advocacy organizations. Gender-specific health programs have benefited from early assessment tools and standardized management protocols.[17,18] Health providers must recognize that they often serve as part of a wider package of humanitarian aid and prevention and that this requires specialized education and training that supports protection, standardized documentation, and accountability for abuses.

Lack of information sharing among major players in complex emergencies, and failed or incompatible communications systems, are important paralyzing factors. Information technologies in Bosnia required high maintenance and placed a heavy burden on staff but did not contribute to the overall efficiency of field operations. There is promise in field-tested satellite telecommunications and image gathering, event monitoring and early warning database systems, and handheld computer links to organizational and research centers.[19] A major challenge for information technologies is not only to aid efficiency but to serve as a tool for fostering collaboration between conventional vertical organizations that are otherwise constrained in their communication and coordination with like organizations.

Ricardo Mazalan/AP Photo

The UN Mission for Somalia, 1996: an attempt to restore order to a country plunged into chaos after a coup

PUBLIC HEALTH RESPONSES

Since the 1991 crisis in northern Iraq all decision makers (civilian and military) have been required to manage the "public health". Failure to do so has been attributed partly to the inability of decision makers to consult and use public health consultants and advisers.[20] The events of this decade show that public health no longer refers only to health and medical care but also encompasses transportation, communication, the judiciary, public safety, and all those disruptions in complex emergencies that must be corrected before a village, town, city, or nation can function (box). This understanding will further encourage professionals to cross boundaries as required to perform integrated assessments and share information and will ensure the place of health professionals in the planning process. In current political-military implementation plans (for ex-

International operational response status of health-related programs

Operational and fully standardized programs:
- Water
- Sanitation
- Nutrition
- Communicable diseases
- Essential drugs
- Individual program assessments

Programs not fully standardized or institutionalized:
- Reproductive health/women's issues
- Human rights monitoring
- Psychosocial or mental health
- Codes of conduct
- Education and training

Not operational or deficiencies exist:
- Information technologies
- Measures of effectiveness
- Security
- Information sharing
- Civil-military collaboration
- Coordinated logistics
- Urban infrastructure
- Urban humanitarian relief
- Consequence management of nuclear, chemical, or biological events
- Integrated assessments

ample, United States Presidential Decision Directive 56) normalization of health indicators is considered the major measure of effectiveness, yet health professionals, other than those who serve the forces themselves, are rarely considered in planning.

Lack of education and female illiteracy have traditionally topped the list of major factors contributing to overall child mortality and morbidity in the developing world. In this decade the moral integrity of governments and the presence of public health infrastructure (both absent in complex emergencies) have replaced these traditional public health indicators. This is especially true in some refugee camps where no education occurs, girls and women have no rights and receive less than their fair share of food and commodities, and male children are recruited into the military. Refugee camps are anomalies of society. Steps must be taken to prevent their growth, except in support of emergency and short-term humanitarian missions. The ability to prevent the establishment of long-term camps will be a major measure of effectiveness.[21]

Communicable diseases thrive in the overcrowded environment of camps, with unsanitary and disrupted infrastructures and the indiscriminate defecation of children. Initially, health programs in complex emergencies did not deal with tuberculosis in refugee camps. However, the prevalence in camps was found to be 4-6%, often with resistant forms and far beyond the alert rates for conventional communities. Dengue fever has emerged as a unique economic indicator of decaying urban infrastructure, prompting closer scrutiny by economists and public health authorities alike.[22] Fears of the transnational spread of communicable diseases from camps and countries with poor public health are among the leading concerns of the developed world. The public in the developed world expects that relief programs will not increase the risk to their lifestyles, so donors will in the future demand attention to prevention, containment, and eradication of infectious agents.

SECURITY ISSUES AND THE NEED FOR CIVIL-MILITARY RESPONSES

Wanton violations of the Geneva Conventions have included unprecedented and widespread rape; massacres; sniper targeting of children, adolescents, and pregnant women; attacks on therapeutic feeding centers; diversion of food by warring factions; and attacks on relief workers—40 Red Cross workers have been killed in the past five years. Peacekeeping forces have also experienced casualty rates statistically higher than if decisive force had been used.[23] These violations are too often relegated to minor news stories and have failed to achieve the level of international concern and debate they deserve. The success of humanitarian assistance will depend on the ability of

Factors contributing to future complex emergencies

- Urbanization of global populations
- Urban dominance of world's poor
- Failing public health infrastructures
- Lack of moral integrity of governments
- Availability of weapons and access to weapons of mass destruction
- Economic inequities and corruption
- Undisciplined military, paramilitary, and police forces
- Suspension of the rule of law
- Wanton violations of protective treaties
- Failures in environmental and ecological security
- Food and water insecurity
- Transmigration of populations due to conflict or political, economic, and environmental issues

international organizations to reinstate and enforce these basic protections.

Civil-military cooperation

The role of peacekeeping forces, under chapter 6 of the UN Charter, has been restricted by ambivalent mission statements and weak rules of engagement, making them ineffective in complex emergencies in the past—for example, UNPROFOR in the former Yugoslavia. Under chapter 7 of the UN Charter peace enforcement operations, such as those in Haiti and Kosovo, are charged with separating warring factions or quelling conflicts before a peace agreement is in place. The requirements for humanitarian assistance may be at their peak during this phase. Future expectations are that military and humanitarian relief organizations will train together as "field units" to provide relief and security to populations during times of active conflict and heightened risk.[24] Chapter 7 requires the coordination, monitoring, and enforcement of international humanitarian and human rights law, so health providers must understand that the role they play in documenting abuses under the law requires a degree of civil-military collaboration without compromise of an agency's autonomy.

In the future regional organizations will probably have more political clout, and regional peacekeeping battalions will develop under a more robust UN Standby Arrangements program. Unfortunately, previous work done to optimize civil-military coordination was compromised in the initial intervention in Kosovo, which was run by NATO. Political decisions made by NATO had the secondary effect of bypassing the humanitarian architecture that was already in place, specifically the UN Office of the Coordinator for Humanitarian Affairs and the early implementation of the UN High Commissioner for Refugees as the lead agency for humanitarian organizations.

Managing the consequences of nuclear, chemical, and biological events, whether accidental or caused by terrorists, is beyond the capabilities of most countries. Coordination of the management of consequences requires a joint process that marries governmental decision makers, tactical level scientists, trained relief workers, and the military to self-sufficient and tailored operational-level task forces. To date only a few non-governmental organizations have shown an interest in integrated education and training, and the international organizations' capabilities are lacking, especially in chemical and biological support.

CONCLUSIONS

The 1990s will be viewed as the decade of the emergence of the complex political disaster, but it is unlikely to be the end of them (box). Many people argue that the role of the international community and the effectiveness of humanitarian assistance have been seriously flawed. Even though health programs have matured greatly, with professionalization of providers, codes of conduct,[25] and research- and field-based education programs, health providers have been frustrated in meeting the challenge to save lives, only to find themselves sliding back again into crisis. Lessons gained through experience in recent complex emergencies will have ready application for future political trials and conflicts.

References

1 Zwi A, Uglade A. Political violence in the third world: a public health issue. *Health Policy and Planning* 1991;6:203-217.
2 Médecins Sans Frontières. *Refugee health: an approach to emergency situations.* London: Macmillan, 1997.
3 Toole MJ, Waldman RJ. Refugees and displaced persons: war, hunger and public health. *JAMA* 1993;270:600-605.
4 Toole MJ, Galson S, Brady W. Are war and public health compatible? *Lancet* 1993;341:1193-1196.
5 Perrin P. *Handbook on war and public health.* Geneva: International Committee of the Red Cross, Health Division, 1996.
6 Borton J. An account of coordination mechanisms for humanitarian assistance during the international response to the 1994 crisis in Rwanda. *Disaster* 1996;20:305-323.
7 Coupland RM. Epidemiological approach to surgical management of the casualties of war. *BMJ* 1994;308:1693-1697.
8 National Defense Council Foundation. World Conflict List: 1 June 1998.
9 Kane H. The hour of departure: forces that create refugees and migrants. *Worldwatch* 1995;Jun:18-25.
10 United Nations High Commissioner for Refugees. TLThe state of the world's refugees: a humanitarian agenda 1998-1999. New York: UN, 1999.
11 International Federation of Red Cross and Red Crescent Societies. *World disasters report 1997.* Oxford: Oxford University Press, 1997.
12 Tharoor S. Confronting ancient animosities. *Washington Post* 1998 Feb 16:34. (National weekly edition.)
13 Public Broadcasting System. All things considered: cultures. Washington, DC: National Public Radio, 1997.
14 Bradshaw AL. *International environmental security: the regional dimensions.* Carlisle Barracks, PA: Center for Strategic Leadership, 1998.
15 Burkholder BT, Toole MJ. Evolution of complex emergencies. *Lancet* 1995;346:1012-1014.
16 Division of Emergency and Humanitarian Action. *Applied health research in emergency settings.* Geneva: World Health Organization; Melbourne: Macfarlane Burnet Center for Medical Research, 1999.
17 Reproductive Health of Refugees Consortium. *Refugees and reproductive health care: the next step.* New York: International Rescue Committee, 1998.
18 Palmer CA, Lush L, Zwi AB. The emergency policy agenda for reproductive health services among populations affected by conflict. *Disaster* 1998;22:236-249.
19 Garshnek V, Shinchi K, Burkle FM. Disaster assessment and satellite communications on the threshold of a new era. *Space Policy* 1998;14:223-227.
20 Minear L, Weiss TG, Campbell KM. *Humanitarianism and war: learning lessons from recent armed conflicts.* Providence, RI: TJ Watson Jr Institute for International Studies, Brown University, 1991.
21 Burkle FM, McGrady KAW, Newett SL, et al. Complex, humanitarian emergencies: III. Measures of effectiveness. *Prehosp and Disaster Med* 1995;10:48-56
22 Dengue fever, a man-made disease. *Economist* 1998 May 2:21.
23 Blechman BM, Vaccaro JM. *Training for peacekeeping: the United Nations' role.* Washington, DC: Henry L Stimson Center, 1994:1-36.
24 Burkle FM. Military security: lessons for relief. In: Leaning J, Briggs SM, Chen LC, eds. *Humanitarian crises.* Cambridge: Harvard University Press, 1999:293-307.
25 Sphere Project. *Humanitarian charter and minimum standards in disaster response.* Geneva: First Edition, 1998:2-56.